

Do all of your work on a separate piece of paper.

Verify each identity.

1. $\tan\alpha\sin\alpha+\cos\alpha=\sec\alpha$

2. $(\sin^2x)(1+\cot^2x)=1$

3. $\sec(-\theta)-\tan(-\theta)=\frac{1+\sin\theta}{\cos\theta}$

4. $\frac{\cot^2\beta-1}{1+\cot^2\beta}=1-2\sin^2\beta$

5. $\frac{\sin\alpha}{\cos\alpha\tan\alpha}=1$

6. $\frac{\tan\theta-\cot\theta}{\tan\theta+\cot\theta}+2\cos^2\theta=1$

7-9, Find all solutions of the equation.

7. $\cos x = 1 - \cos x$

8. $4\sin 2x = 1 + 2\sin 2x$

9. $\cos x = \sqrt{3}\sin x$

10-12, Find all solutions of the equation in the interval $[0, 2\pi)$.

10. $3 - 2\cos^2 x = 3\sin x$

11. $4\cot^2 x - 4 = 0$

12. $\sec x \sin x = 2\sin x$

13-20, Find the exact value.

13. $\sin(-165^\circ)$

14. $\cos\left(\frac{-5\pi}{12}\right)$

15. $\tan\frac{7\pi}{8}$

16. $\cos 105^\circ$

17. $\cos 80^\circ \cos 20^\circ + \sin 80^\circ \sin 20^\circ$

18. $\tan\theta = \frac{3}{4}, \pi < \theta < \frac{3\pi}{2}$ find $\sin 2\theta$

19. $\sec\theta = 3, \frac{3\pi}{2} < \theta < 2\pi$, find $\sin\frac{\theta}{2}$

20. $\csc\alpha = -2, \pi < \alpha < \frac{3\pi}{2}$, find $\cos\frac{\alpha}{2}$.

Answers: 7. $\frac{\pi}{3} + 2n\pi, \frac{5\pi}{3} + 2n\pi$

8. $\frac{\pi}{12} + n\pi, \frac{5\pi}{12} + n\pi$

9. $\frac{\pi}{6} + n\pi$

10. $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{\pi}{2}$

11. $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

12. $0, \pi, \frac{\pi}{3}, \frac{5\pi}{3}$

13. $\frac{\sqrt{2}-\sqrt{6}}{4}$

14. $\frac{\sqrt{6}-\sqrt{2}}{4}$

15. $\frac{-2+\sqrt{2}}{\sqrt{2}}$

16. $\frac{\sqrt{2}-\sqrt{6}}{4}$

17. $\frac{1}{2}$

18. $\frac{24}{25}$

19. $\frac{\sqrt{3}}{3}$

20. $\frac{-\sqrt{2-\sqrt{3}}}{2}$